

## Effect of Magnified and Equality of Irrigation Water in the Soil Saturated Hydraulic Conductivity and the Soil Water Infiltration in Clay Loam Soil During the Growth Stages of Barley Crop (*Hordium Vulgare L.*)

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**Abstract:** Field experiments were conducted at the research station, College of Agriculture, University of Basra at Garmit Ali district. The experiments were carried out during the Winter season 2012-2013 in clay loam soil. The aims of the research are to study the effect of water magnetization and the quality of irrigation water in the saturated hydraulic conductivity of the soil and the water infiltration during the plant growth stages (beginning of the forest, beginning of flowering and after crop harvesting) of barley crop (*Hordium vulgare L.*). The magnetization of irrigation water treatments included, non-magnetized water ( $M_0$ ) and Magnetized water ( $M_1$ ). The irrigation water quality treatments included five types of water namely, Tap Water (TW), River Water (RW), sewage Water (WW), treated sewage water passed through sandy filter (WWT) and Mixed Water (MW) (50% RW+50% WWT). The experiments were conducted using factorial Randomized Complete Block Design (RCBD). The irrigation water was added on the basis of the shortfall in the level of water of the evaporation basin installed in the field. The amount of water added was 100% of the amount vaporized water plus 20% for leaching requirements. The results showed that: magnetized water treatments surpassed the non-magnetized water treatments in increasing the soil saturated hydraulic conductivity for both depths 0-30 and 30-60 cm. TW treatment gave the highest value of the soil saturated hydraulic conductivity while RW treatment gave the lowest values for both depths. The WW, WWT and MW treatments gave intermediate values of soil saturated hydraulic conductivity. The order of the treatments effect on the soil saturated hydraulic conductivity is WWT>WW>MW for depth of 0-30 cm while the order is WW>WWT>MW for depth 30-60 cm.

**Key words:** Magnified water, sewage water, soil hydraulic conductivity, water infiltration, experiment, TW

### INTRODUCTION

The irrigation water is regarded the main factor in determining the crops production in arid and semi-arid regions. The agriculture in Iraq suffers for shortage of irrigation water and deterioration of its equality. The magnetization method is used to improve water quantity. This method also can improve the soil physical properties. Water magnetization is carried out by passing the water through magnetic field with predetermining water discharge. The magnetic field breakdowns the hydrogen bonds and unregulated bonds of the water molecular. This operation resulted in that the water molecular bonded in a chain. The water molecular chain enables the water solving the nutrition elements and the salts in the soil and that increases the nutrient elements for the plants growth. Using the sewage water for irrigation can provided great amount of water after treatment and that can compensate the shortages in irrigation water. The treated sewage water can reduce the water and soil contaminations as well as supplied the ground water with extra amount to compensate its shortages. The treated sewage water also

provided the soil with organic matter which improves the soil physical properties and provided it with nutrition elements which can increases crops production (Pescod,1992). Using the sewage water in agriculture reduces its problems which causes to the environment and can improve crops production. The sewage water amount is increasing by time because the world population increasing yearly, so that, using it in agriculture to compensate the irrigation water shortages is regarded the best method to reduce the soil contaminations and revers water (Ghanbari *et al.*, 2007).

To reduce unwanted material in the sewage water, it should be passed through filters. The experiments showed that the best filter is the column of sand. The treated water should be passed through the sand column slowly. The sand column divided into many layers. The coarse sand should be at the top, fine sand at the middle and fin sand at the bottom. This method of sewage water treatment is old but it is the best so far and the cheapest cheap.

The aims of this research is to study the effect of magnetized water and the treated sewage water on the soil saturated hydraulic conductivity and water infiltration during the plant growth stages.